Space Weather Forecast

Issued on Monday, 09 May 2022 at 01:11 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Minor Geomagnetic Storm G1 later in UTC day of Tuesday. Chance of Moderate-class X-ray flares and R1/R2 radio blackouts.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been low through the UTC day of Sunday 08 May, with isolated common-class flares recorded. The largest of these flares occurred at 08/1938UTC from a new sunspot region arriving over the southeastern solar horizon, with the general area perhaps forming more than one sunspot group. This event appeared to produce ejecta in two stages, and although this has yet to be analysed, any Earth-bound component is very unlikely, as is any solar radiation storm affecting Earth.

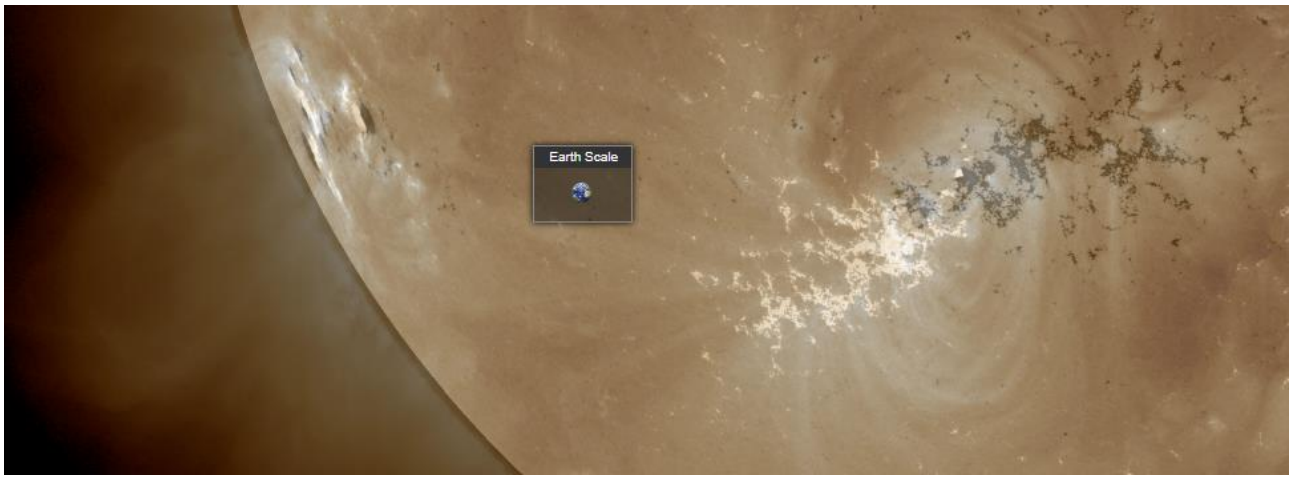

Figure 1: False-colour magnetic and extreme UV satellite composite image (courtesy of Helioviewer.org) of aftermath of the large common-class X-ray flare and southeastern solar horizon CME (shown) from the vicinity of an arriving sunspot group. Also shown is the remnant (large black and white region in right half of image) of the sunspot group that produced last week's strong-class X-ray flare. Earth is shown inset for scale.

There are currently five sunspot regions on the facing side of the sun. The two dominant sunspots of last working week (delivering many moderate-class X-ray flares at that time) now appear generally in decline. By contrast, in the ascendency was the southeastern solar horizon spot(s), although the narrow viewing angle for this cluster is hampering proper analysis for the time being to properly assess its likelihood to flare. All other spots groups were stable or in decline, with no significant activity recorded.

The solar 'tropics' remain congested with long chains of 'filaments' (arcs of plasma) at present. Of note was a northeast quarter of the sun possible filament 'lift off' around 08/0200UTC, roughly

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coincident with a southeastern solar horizon Coronal Mass Ejection (CME). Any filament CME from the 08/0200UTC event is extremely faint and has not been analysable to date, however imagery does suggest that possible faint ejecta is mainly above and behind Earth in the track of its orbit. A third possible filament-related event occurred just after 08/1200UTC in the northwest of the sun, with a narrow CME subsequently seen heading well west in imagery. A final event was from the southeastern horizon spot's common-class flare (the possible CME pair), with no Earth-bound component anticipated, although analysis is pending.

All considered, no CMEs were confirmed in available satellite imagery in the past 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind followed a slow regime, with the speed showing a gradual rise and fall within background. The number of particles comprising the wind was unremarkable, and while the magnitude of their associated magnetic field was a little erratic and mostly anti-aligned (with Earth's field), this still only resulted in mainly quiet geomagnetic activity.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be low to moderate, as although some of the more potent recent spots are quietening down and/or rotating off the facing side of the sun, newly-arrived active regions in the southeast are bolstering the risk to a degree.

Solar Wind / Geomagnetic Activity: A CME spawned by a 'disappearing filament' 06/1900UTC may give Minor Geomagnetic Storm G1 intervals later Tuesday 10 May and on into Wednesday (UTC days). No significant 'coronal holes' feature in this forecast - in any case, the sole small feature will likely be coincident with the aforementioned CME and its effect therefore masked. Geomagnetic activity should otherwise be quiet to start and end the four-day period in the prevailing slow solar wind regime, probably most reliably so on Monday 09 May.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, with a daily Slight Chance of S1 largely the result of one of the largest sunspot's position near the better-connecting (with Earth should it produce a proton-rich flare) western solar horizon.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	30	20	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

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Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	40	40	30	30
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	2	5	5	2
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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